

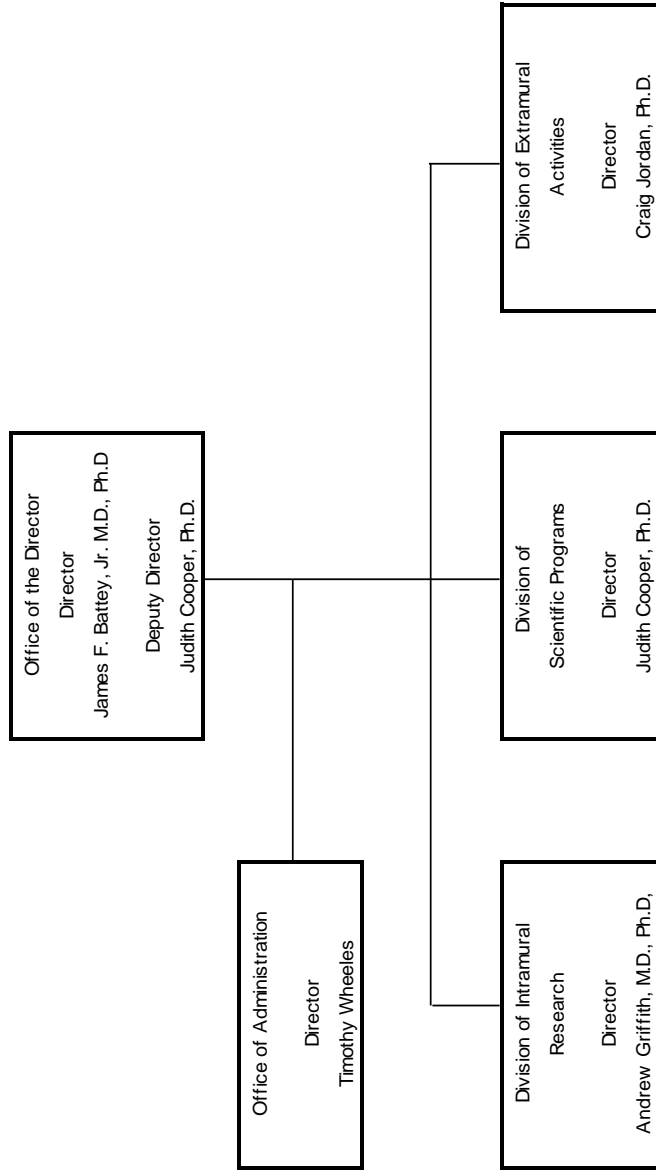
DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

National Institute on Deafness and Other Communication Disorders (NIDCD)

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NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders



NATIONAL INSTITUTES OF HEALTH

National Institute on Deafness and Other Communication Disorders

For carrying out section 301 and title IV of the PHS Act with respect to deafness and other communication disorders, ~~["\$404,049,000"]~~*\$403,933,000*.

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Amounts Available for Obligation¹

(Dollars in Thousands)

Source of Funding	FY 2013 Actual	FY 2014 Enacted	FY 2015 President's Budget
Appropriation	\$416,273	\$404,049	\$403,933
Type 1 Diabetes	0	0	0
Rescission	-833	0	0
Sequestration	-20,894	0	0
Subtotal, adjusted appropriation	\$394,546	\$404,049	\$403,933
FY 2013 Secretary's Transfer	-2,302	0	0
OAR HIV/AIDS Transfers	0	0	0
Comparative transfers to NLM for NCBI and Public Access	-466	-556	0
National Children's Study Transfers	335	0	0
Subtotal, adjusted budget authority	\$392,113	\$403,493	\$403,933
Unobligated balance, start of year	0	0	0
Unobligated balance, end of year	0	0	0
Subtotal, adjusted budget authority	\$392,113	\$403,493	\$403,933
Unobligated balance lapsing	-39	0	0
Total obligations	\$392,074	\$403,493	\$403,933

¹ Excludes the following amounts for reimbursable activities carried out by this account:

FY 2013 - \$2,566 FY 2014 - \$2,500 FY 2015 - \$2,500

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders
Budget Mechanism - Total¹

(Dollars in Thousands)

MECHANISM	FY 2013 Actual		FY 2014 Enacted ²		FY 2015 President's Budget		FY 2015 +/- FY 2014	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
<u>Research Projects:</u>								
Noncompeting	623	\$213,472	563	\$209,430	553	\$209,489	-10	\$59
Administrative Supplements	(26)	728	(40)	1,750	(27)	750	(-13)	-1,000
Competing:								
Renewal	38	17,305	41	18,815	40	18,360	-1	-455
New	123	39,679	134	43,555	133	43,254	-1	-301
Supplements	1	278	0	0	0	0	0	0
Subtotal, Competing	162	\$57,262	175	\$62,370	173	\$61,614	-2	-\$756
Subtotal, RPGs	785	\$271,462	738	\$273,550	726	\$271,853	-12	-\$1,697
SBIR/STTR	24	10,104	28	11,000	29	11,350	1	350
Research Project Grants	809	\$281,566	766	\$284,550	755	\$283,203	-11	-\$1,347
<u>Research Centers:</u>								
Specialized/Comprehensive	19	\$15,421	21	\$17,440	21	\$17,440	0	\$0
Clinical Research	0	147	0	160	0	160	0	0
Biotechnology	0	476	0	500	0	500	0	0
Comparative Medicine	0	0	0	0	0	0	0	0
Research Centers in Minority Institutions	0	0	0	0	0	0	0	0
Research Centers	19	\$16,043	21	\$18,100	21	\$18,100	0	\$0
<u>Other Research:</u>								
Research Careers	37	\$6,052	42	\$7,200	42	\$7,200	0	\$0
Cancer Education	0	0	0	0	0	0	0	0
Cooperative Clinical Research	0	0	0	0	0	0	0	0
Biomedical Research Support	0	0	0	0	0	0	0	0
Minority Biomedical Research Support	0	0	0	0	0	0	0	0
Other	24	4,535	26	4,900	27	5,400	1	500
Other Research	61	\$10,588	68	\$12,100	69	\$12,600	1	\$500
Total Research Grants	889	\$308,196	855	\$314,750	845	\$313,903	-10	-\$847
<u>Ruth L Kirchstein Training Awards:</u>	FTTPs		FTTPs		FTTPs		FTTPs	
Individual Awards	113	\$4,514	122	\$4,975	122	\$5,075	0	\$100
Institutional Awards	172	7,936	152	7,150	152	7,295	0	145
Total Research Training	285	\$12,450	274	\$12,125	274	\$12,370	0	\$245
Research & Develop. Contracts	30	\$15,294	32	\$18,444	32	\$20,500	0	\$2,056
<i>(SBIR/STTR) (non-add)</i>	(0)	(66)	(0)	(70)	(0)	(70)	(0)	(0)
Intramural Research	66	36,500	68	37,220	68	37,220	0	0
Res. Management & Support	74	19,674	72	19,940	72	19,940	0	0
<i>Res. Management & Support (SBIR Admin) (non-add)</i>	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Construction		0		0		0		0
Buildings and Facilities		0		0		0		0
Total, NIDCD	140	\$392,113	140	\$403,493	140	\$403,933	0	\$440

¹ All items in italics and brackets are non-add entries. FY 2013 and FY 2014 levels are shown on a comparable basis to FY 2015.

² The amounts in the FY 2014 column take into account funding reallocations, and therefore may not add to the total budget authority reflected herein.

Major Changes in the Fiscal Year 2015 President's Budget Request

Major changes by budget mechanism and/or budget activity detail are briefly described below. Note that there may be overlap between budget mechanism and activity detail and these highlights will not sum to the total change for the FY 2015 President's Budget request for NIDCD, which is \$0.440 million more than the FY 2014 Enacted level, for a total of \$403.933 million.

Research Project Grants (-\$1.347 million; total \$283.203 million):

NIDCD will support a total of 755 Research Project Grant (RPG) awards in FY 2015, a decrease of 11 awards.

Other Research (+\$0.500 million; total \$12.600 million):

Other Research-Other will increase by 1 award and by \$0.500 million.

Research & Development Contracts (+\$2.056 million; total \$20.500 million):

Funds are included in R&D contracts to support trans-NIH initiatives, such as Basic Behavioral and Social Sciences Opportunity Network (OppNet).

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Summary of Changes¹

(Dollars in Thousands)

FY 2014 Enacted				\$403,493
FY 2015 President's Budget				\$403,933
Net change				\$440
CHANGES	FY 2015 President's Budget		Change from FY 2014	
	FTEs	Budget Authority	FTEs	Budget Authority
A. Built-in:				
1. Intramural Research:				
a. Annualization of January 2014 pay increase & benefits		\$11,863		\$29
b. January FY 2015 pay increase & benefits		11,863		87
c. Zero more days of pay (n/a for 2015)		11,863		0
d. Differences attributable to change in FTE		11,863		0
e. Payment for centrally furnished services		6,346		104
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		19,011		0
Subtotal				\$220
2. Research Management and Support:				
a. Annualization of January 2014 pay increase & benefits		\$10,815		\$27
b. January FY 2015 pay increase & benefits		10,815		80
c. Zero more days of pay (n/a for 2015)		10,815		0
d. Differences attributable to change in FTE		10,815		0
e. Payment for centrally furnished services		2,484		42
f. Increased cost of laboratory supplies, materials, other expenses, and non-recurring costs		6,642		0
Subtotal				\$149
Subtotal, Built-in				\$369

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Summary of Changes - Continued¹

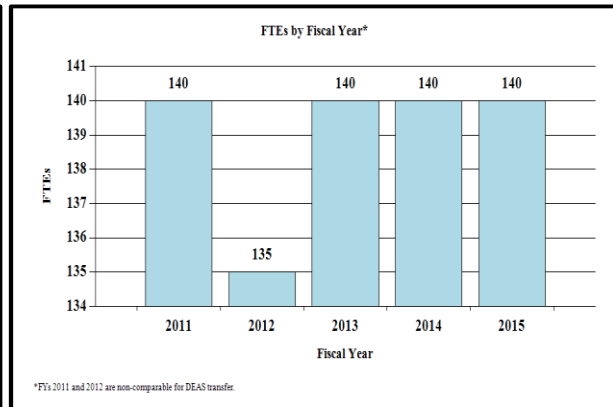
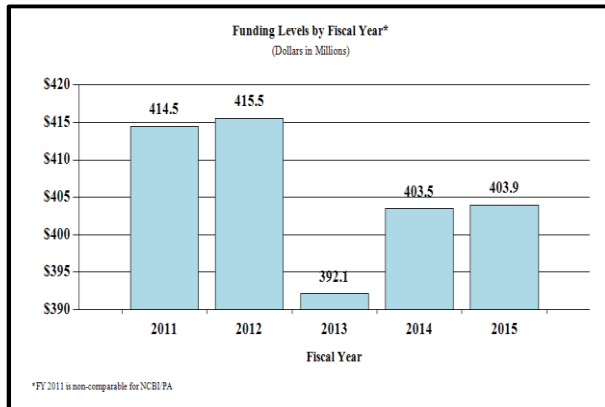
(Dollars in Thousands)

CHANGES	FY 2015 President's Budget		Change from FY 2014	
	No.	Amount	No.	Amount
B. Program:				
1. Research Project Grants:				
a. Noncompeting	553	\$210,239	-10	-\$941
b. Competing	173	61,614	-2	-756
c. SBIR/STTR	29	11,350	1	350
Subtotal, RPGs	755	\$283,203	-11	-\$1,347
2. Research Centers	21	\$18,100	0	\$0
3. Other Research	69	12,600	1	500
4. Research Training	274	12,370	0	245
5. Research and development contracts	32	20,500	0	2,056
Subtotal, Extramural		\$346,773		\$1,454
6. Intramural Research	FTEs 68	\$37,220	FTEs 0	-\$220
7. Research Management and Support	72	19,940	0	-149
8. Construction		0		0
9. Buildings and Facilities		0		0
Subtotal, Program	140	\$403,933	0	\$1,085
Total changes				\$440

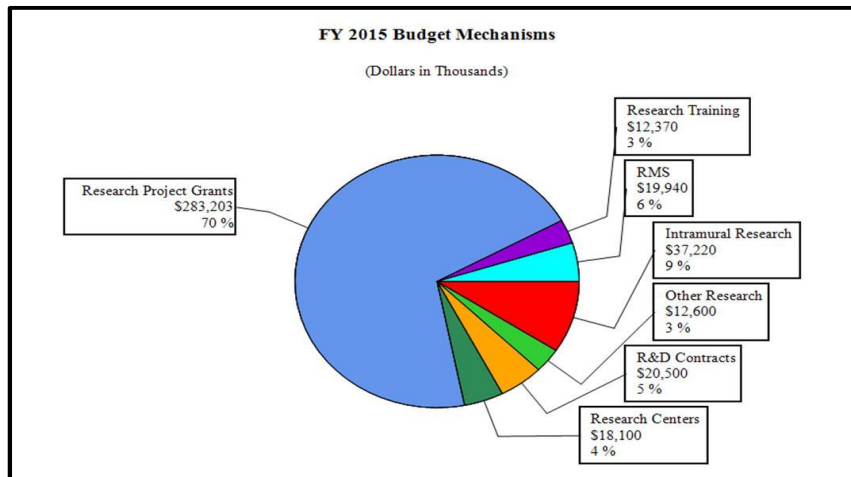
¹ The amounts in the Change from FY 2014 column take into account funding reallocations, and therefore may not add to the net change reflected herein.

Fiscal Year 2015 Budget Graphs

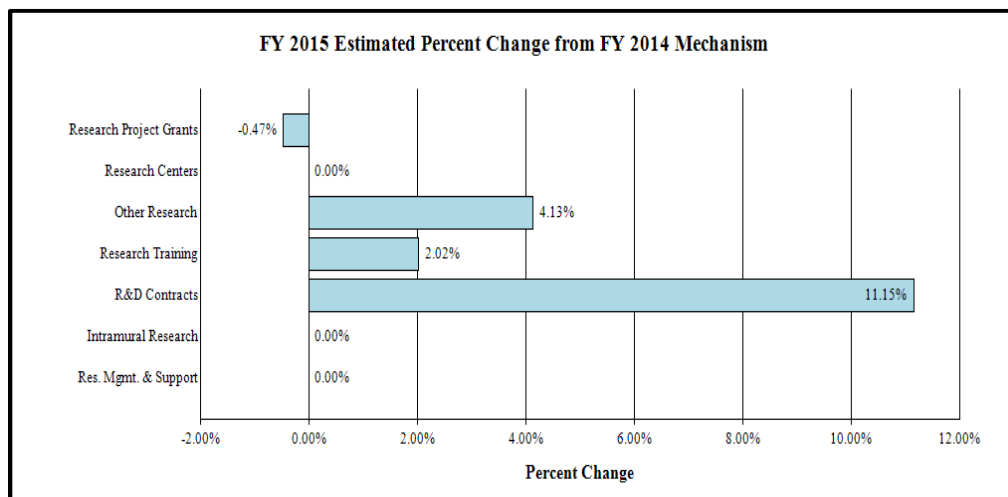
History of Budget Authority and FTEs:



Distribution by Mechanism:



Change by Selected Mechanism:



NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Budget Authority by Activity¹
(Dollars in Thousands)

	FY 2013 Actual		FY 2014 Enacted ²		FY 2015 President's Budget		FY 2015 +/- FY 2014	
<u>Extramural Research</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>	<u>FTE</u>	<u>Amount</u>
<u>Detail</u>								
Hearing and Balance		\$196,457		\$201,943		\$202,793		\$850
Taste and Smell		53,616		55,113		55,345		232
Voice, Speech, and Language		85,866		88,263		88,635		372
Subtotal, Extramural		\$335,940		\$345,319		\$346,773		\$1,454
Intramural Research	66	\$36,500	68	\$37,220	68	\$37,220	0	\$0
Research Management & Support	74	\$19,674	72	\$19,940	72	\$19,940	0	\$0
TOTAL	140	\$392,113	140	\$403,493	140	\$403,933	0	\$440

¹ Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

² The amounts in the FY 2014 column take into account funding reallocations, and therefore may not add to the total budget authority reflected herein.

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Authorizing Legislation

	PHS Act/ Other Citation	U.S. Code Citation	2014 Amount Authorized	FY 2014 Enacted	2015 Amount Authorized	FY 2015 President's Budget
Research and Investigation	Section 301	42§241	Indefinite		Indefinite	
National Institute on Deafness and Other Communication Disorders	Section 401(a)	42§281	Indefinite	\$403,493,000	Indefinite	\$403,933,000
Total, Budget Authority				\$403,493,000		\$403,933,000

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Appropriations History

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation
2005 Rescission	\$393,507,000	\$393,507,000	\$399,000,000	\$397,507,000 (\$3,247,000)
2006 Rescission	\$397,432,000	\$397,432,000	\$418,537,000	\$397,432,000 (\$3,974,320)
2007 Rescission	\$391,556,000	\$391,556,000	\$395,188,000	\$393,458,000 \$0
2008 Rescission Supplemental	\$393,682,000	\$400,305,000	\$402,680,000	\$394,138,000 (\$7,008,000) \$2,096,000
2009 Rescission	\$395,047,000	\$408,587,000	\$406,000,000	\$407,259,000 \$0
2010 Rescission	\$413,026,000	\$422,308,000	\$414,755,000	\$418,833,000 \$0
2011 Rescission	\$429,007,000		\$428,331,000	\$418,833,000 (\$3,677,604)
2012 Rescission	\$426,043,000	\$426,043,000	\$410,482,000	\$417,061,000 (\$788,245)
2013 Rescission Sequestration	\$417,297,000		\$418,562,000	\$416,272,755 (\$832,546) (\$20,894,030)
2014 Rescission	\$422,936,000		\$420,125,000	\$404,049,000 \$0
2015	\$403,933,000			

Justification of Budget Request

National Institute on Deafness and Other Communication Disorders

Authorizing Legislation: Section 301 and title IV of the Public Health Service Act, as amended.

	FY 2013 Actual	FY 2014 Enacted	FY 2015 President's Budget	FY 2015 +/- FY 2014
BA	\$392,113,173	\$403,493,000	\$403,933,000	+\$440,000
FTE	140	140	140	0

Program funds are allocated as follows: Competitive Grants/Cooperative Agreements; Contracts; Direct Federal/Intramural and Other.

Director's Overview

Approximately one in six Americans will experience a communication disorder to some degree in his or her lifetime. For those individuals, the basic components of communication (sensing, interpreting, and responding to people and things in our environment) can be challenging. The National Institute on Deafness and Other Communication Disorders (NIDCD) manages a broad intramural and extramural portfolio of both basic and clinical research focused on human communication research and their associated disorders in three program areas: hearing and balance; taste and smell; and voice, speech, and language.

NIDCD Accomplishments. In October 2013, the NIDCD celebrated its 25th anniversary. Over the past 25 years, NIDCD-supported scientists have made astonishing advances in the NIDCD's mission areas. Numerous discoveries have expanded our knowledge base and led to improved diagnosis, treatment, and technology for people with communication disorders. For example, the cochlear implant, one of the most groundbreaking biomedical achievements of the past 30 years, was developed as the result of NIDCD funding. Two researchers involved in this effort were the recipients of the 2013 Lasker-DeBakey Award in Clinical Medical Research for their work in the development of cochlear implants. Also, NIDCD's research efforts provided the evidence base for statewide newborn and infant hearing screen programs, resulting in the screening of nearly all infants born in U.S. hospitals for hearing loss as of 2010, up from as few as one-tenth infants screened in 1993.

- **Today's Basic Science for Tomorrow's Breakthroughs – Inner Ear Tip Link Regrowth¹:** Teams of NIDCD-supported intramural and extramural scientists are the first to show, in mice, a two-step process occurring during the growth and regeneration of inner ear tip links. Tip links are extracellular tethers that link stereocilia, the tiny sensory projections on inner ear hair cells that convert sound into electrical signals; however, tip links break easily with exposure to noise (e.g., after a loud blast of sound or a loud concert). Unlike hair cells, which do not

¹ <http://www.ncbi.nlm.nih.gov/pubmed/23776407>

regenerate in humans, tip links can repair themselves mostly, within a matter of hours. This new study elucidates how the tip links reassemble. The discovery offers a possible mechanism for potential interventions that could preserve hearing in people whose hearing loss is caused by genetic disorders related to tip link dysfunction.

- **Precision Medicine – Odorant Receptor Variation²:** Sometimes people avoid eating healthy vegetables, and many prefer to eat foods that are much less nutritious. Smell and taste interact to provide a sense of food flavor, and scientists hypothesize that individual variations in genes that help us detect smell may play a role in food selection. NIDCD-supported scientists recently identified a genetic variation that influences how a person responds to a grassy odor called C3HEX, which is given off by many fruits and vegetables. Their data demonstrate that slight changes in the gene for a receptor that detects this odor can make a person more or less responsive to C3HEX, and one change makes people unable to detect it at all. Understanding how odors and genes influence our food choices may lead to ways to change what we choose to eat. (For instance, as mentioned below, by the addition of volatile odors to foods to enhance their sweetness).
- **Today's Basic Science for Tomorrow's Breakthroughs – Uncovering the Neurological Basis of Speech Motor Control³:** NIDCD-supported scientists have for the first time identified how the brain coordinates movement of multiple articulators (for example, the lips, jaw, tongue, and larynx) involved in speech production. By directly recording electrical activity from the brains of individuals undergoing brain surgery, the scientists were able to develop a map of the brain that allowed them to observe how neural activity in the speech sensorimotor cortex works during speech production. This information has potential implications for developing computer-brain interfaces for artificial speech communication and for the treatment of speech disorders.

NIDCD Plans, Priorities, and Challenges for the Future. NIDCD continues its support of new and competing Research Project Grants from investigators who have innovative ideas and fresh perspectives. NIDCD's research will also help inform the innovations supported through the NIH Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative, part of a new Presidential focus aimed at revolutionizing our understanding of the human brain. Driven by compelling public health needs along with recent scientific progress, NIDCD prioritizes its research investment to identify the most promising opportunities for human communication research, including:

- **Precision Medicine – Clinical Trials:** NIDCD is funding three clinical trials to test safety and efficacy of new devices to treat balance disorders and tinnitus in individuals whose conditions do not respond to conventional treatment. The vestibular prosthesis aims to restore a sense of balance to persons who suffer chronic disorientation in space and related balance problems. Two devices for tinnitus take advantage of the brain's plasticity to change how different parts of the brain communicate with each other, in order to alleviate awareness of and negative response to tinnitus. One device pairs auditory tones with stimulation of the vagus nerve in the neck to help the human brain decide what is worthy of attention and what is not,

² <http://www.ncbi.nlm.nih.gov/pubmed/22714804>

³ <http://www.ncbi.nlm.nih.gov/pubmed/23426266>

in an attempt to “re-train” the neurons to fire more appropriately. The other device is an electrode placed deep within brain auditory centers to block negative reactions to the phantom sounds, so the person can ignore them. NIDCD hopes these and other clinical trials will one day lead to new effective treatments for balance problems and tinnitus when conventional treatment does not help.

- **Nurturing Talent and Innovation – National Mentoring Network to Enhance the Clinician-Investigator Workforce:** NIDCD continues to place great emphasis on training and career development of scientists. There is a lack of appropriate research mentors available nationwide for developing clinicians, notably, otolaryngologists, speech-language pathologists, and audiologists, into clinician-scientists. Because of this, the NIDCD launched a pilot program that established national mentoring networks to leverage senior scientific mentors and other mentoring resources to nurture clinically trained individuals at a junior career stage to build a research trajectory into their careers. These mentoring networks will strengthen the research workforce of clinician-scientists to facilitate translation of “bench to bedside” research on human communication disorders.

Overall Budget Policy:

The FY 2015 President’s Budget request for NIDCD is \$403.933 million, an increase of \$0.440 million or 0.1 percent above the FY 2014 Enacted level. NIDCD will continue to support new and early stage investigators, and will keep the number of competing Research Project Grants (RPG’s) approximately flat (reduction of 2). In FY 2015, NIDCD will support new investigators on R01 equivalent awards at success rates approximately equal to those of established investigators submitting new R01 equivalent applications. FY 2015 Noncompeting RPG’s will be funded at the full-committed level.

NIDCD allocates a portion of the funds available for competing RPG’s to High Program Priority (HPP) projects outside of the automatic pay line. NIDCD will continue emphasizing faculty, postdoctoral, and student training in our three program areas: hearing and balance; taste and smell; and voice, speech and language sciences. Trained investigators will be encouraged to choose a research career through the Pathways to Independence program. Stipend rates for predoctoral trainees and fellows increase by 2 percent. Funds are included in R&D Contracts to support trans-NIH initiatives, such as the Basic Behavioral and Social Sciences Opportunity Network (OppNet).

Program Descriptions and Accomplishments

Hearing and Balance Program: The NIDCD is pleased that the 2013 Lasker-DeBakey Award in Clinical Medical Research was given to two NIDCD grantees for their contributions to the development of the modern cochlear implant, which is a small electronic device that provides a sense of sound to people who are profoundly deaf or severely hard-of-hearing. According to the Food and Drug Administration (FDA), as of December 2012, approximately 324,200 people worldwide have received implants. In the U.S., roughly 58,000 adults and 38,000 children have received them.

Hearing and balance disorders decrease quality of life. They also cross all ethnic and socioeconomic lines. Approximately 36 million American adults report some degree of hearing loss⁴ and almost eight million adults report a chronic problem with balance.⁵ In addition, two to three out of 1,000 babies born in the U.S. each year have a detectable hearing loss⁶ that can affect their speech, language, social, and cognitive development. Accordingly, research projects within the NIDCD Hearing and Balance program encompass over half of NIDCD's portfolio. The loss of hearing or balance also can impose significant social and economic burdens upon individuals, their families, and the communities in which they live. Millions of Americans experience a hearing or balance disorder at some point in their life, especially as young children or older adults. Common examples include middle ear infections (otitis media), noise-induced hearing loss, tinnitus, age-related hearing loss, dizziness, and vertigo. To study normal and disordered functions of the auditory and vestibular systems, NIDCD employs a wide range of research approaches such as molecular genetics, cellular biology, biomedical imaging, nanotechnology, psychoacoustics, and structural and functional biology. NIDCD supports research that will lead to improved treatments for, and prevention of, hearing and balance disorders.

One particular area of interest is research on the affordability and accessibility of hearing health care. Only about one in five of those individuals who could benefit from a hearing aid wears one. In addition, effective hearing health care may allow continued participation in economic activities (work and leisure) into the older ages. For many reasons, the hearing health needs of the vast majority of adults with hearing loss are not being met. There is both urgency and opportunity to address these research needs. Based on recommendations from a NIDCD workshop on Accessible and Affordable Hearing Health Care for Adults with Mild to Moderate Hearing Loss, the NIDCD is currently funding many new research initiatives that can be developed into models for improving hearing health care. In FY 2015, the NIDCD is continuing its support of many Funding Opportunity Announcements so it can expand its portfolio on hearing health care research, with the goal of developing research-based technologies that are affordable, effective, culturally acceptable, and accessible to those who need them.

⁴ Based on NCHS/NHIS data for 2007.

⁵ Based on prevalences from the 1994–95 Disability Supplement to the NHIS and current US population estimates.

⁶ Centers for Disease Control and Prevention (CDC). Identifying infants with hearing loss - United States, 1999-2007. *MMWR Morb Mortal Wkly Rep.* 59(8): 220-223. Gaffney M, Green DR, Gaffney C. Newborn hearing screening and follow-up: are children receiving recommended services? *Public Health Rep.* 125(2): 199-207, 2010.

Budget Policy:

The 2015 President's Budget for the Hearing and Balance program is \$202.793 million, an increase of \$0.850 million or 0.4 percent from the FY 2014 Enacted level. In FY 2015, the program will continue emphasizing faculty, postdoctoral, and student training on hearing and balance sciences. Trained investigators will be encouraged to choose a research career through the Pathways to Independence program. Making R01 awards to first-time and early-stage investigators in the area of hearing and balance sciences will be given funding priority.

Taste and Smell Program: Each year, more than 200,000 people visit a physician for chemosensory problems such as taste and smell disorders⁷. Many more taste and smell disorders go unreported. The NIDCD Taste and Smell program supports the study of the chemical senses, taste and smell, to enhance our understanding of how individuals communicate with their environment and how chemosensory disorders can be identified and treated. Taste and smell play important roles in preferences and aversions for aromas, specific foods, and flavors. By providing knowledge on food preferences, research on taste and smell may help increase our understanding of obesity and diabetes and help develop prevention and treatment strategies. Taste and smell preferences can also influence whether someone is willing to take a needed medication.

Serious health problems like obesity, diabetes, hypertension, malnutrition, Parkinson's disease, Alzheimer's disease, and multiple sclerosis are all accompanied or signaled by chemosensory problems. NIDCD-supported research on molecular and cellular biology, biophysics, biochemistry, brain imaging, and functional circuitry of the olfactory and gustatory systems is paving the way for improved diagnosis, prevention, and treatment of chemosensory disorders. Research on how insects smell and how they target a host may also help us learn to prevent transmission of diseases such as malaria, which affects millions of people worldwide. For example, one current NIDCD-supported project is investigating how odors, temperature variation, and concentration gradients detected by mosquitos help determine the insects' behavior when seeking out blood hosts. This information may help us develop noninvasive mosquito repellants and/or attractants. This application was submitted in response to the NIH/NSF Collaborative Research in Computational Neuroscience Funding Opportunity Announcement.

⁷ <http://www.nidcd.nih.gov/health/statistics/smelltaste/stquickstats.htm>.

Program Portrait: Taste Research

FY 2014 Level: \$19.0 million

FY 2015 Level: \$19.0 million

Change: \$0.0 million

The NIDCD supports the study of the chemical senses (taste and smell) to understand how we communicate with our environment and how we can identify and treat chemosensory disorders. Taste plays an important role in determining what people choose to eat. Specialized cells in the human mouth can detect at least five basic taste qualities: sweet, sour, bitter, salty, and savory (umami).

Understanding humans' tendency to consume too much salt is an area of high research priority due to the high levels of salt found in the processed foods that comprise the typical modern diet. Too much salt raises blood pressure, and high blood pressure is related to numerous health conditions, including heart disease, kidney failure, and stroke. NIDCD-supported scientists demonstrated that babies who eat starchy, salty foods are more likely to develop a preference for salty taste by as early as six months of age. This early salt preference endures into preschool ages. The scientists are now working to determine if early salt experience can predict future sodium intake, blood pressure, or other health-related outcomes.

Many individuals tend to reject the bitter taste of some healthy vegetables and lifesaving medications and prefer sweet, calorie-rich foods. NIDCD is funding important research to figure out how to overcome these tendencies, to help us take our medicines, and to keep us from becoming obese in a world where calories are easy to find.

One exciting new project aims to use the volatile chemicals (odorants) given off by foods to enhance sweet taste. This project involves the collaborative research efforts of a unique team of chemosensory scientists and horticulturists. They will work to develop a scale to quantify which odorants enhance sweetness, in the hope of using this information to enhance the taste of foods. If successful, this research could help us learn to consume less sugar and artificial sweeteners, while still enjoying our food. It may also be used to increase the likelihood that we will consume bitter-tasting medicines and vegetables, such as broccoli and Brussel sprouts.

Rejection of bitter medicines is particularly challenging to overcome in children, who are less able to understand why they must swallow something that tastes so terrible to them. They are also particularly sensitive to bitterness, and many cannot swallow tablets or capsules that encapsulate and mask the bitter taste of medicines. Accordingly, NIDCD is supporting another project focused on translating the use of bitter blockers to get children to take their medicines. The research will help us understand which bitter blockers work best and will identify the variation in sensitivity to bitterness among children. This information will help us formulate drugs that children will be willing to take, increasing the likelihood that they can be helped by modern medicines.

In FY 2015, NIDCD will continue to support the incorporation of standard taste and smell measures into the National Health and Nutrition Examination Survey (NHANES), a nationally-representative, population based survey. This project will help determine the prevalence of smell and/or taste impairment in the U.S., as well as to identify risk factors for smell or taste loss and possible associated conditions such as obesity, altered dietary intake, and chronic illnesses such as asthma, cardiovascular disease, and diabetes.

Budget Policy:

The 2015 President's Budget for the Taste and Smell program is \$55.345 million, an increase of \$0.232 million or 0.4 percent from the FY 2014 Enacted level. In FY 2015, the program will continue emphasizing faculty, postdoctoral, and student training on smell and taste sciences. Trained investigators will be encouraged to choose a research career through the Pathways to Independence program. Making R01 awards to first-time and early-stage investigators in the area of smell and taste sciences will be given funding priority.

Voice, Speech, and Language Program: Voice, speech, and language are tools that all individuals use to communicate or share thoughts, ideas, and emotions. However, approximately 7.5 million people in the United States have trouble using their voice⁸. By the first grade, roughly five percent of children have noticeable speech disorders⁹. Between six and eight million people in the U.S. have some form of language impairment¹⁰. The NIDCD Voice, Speech, and Language program continues to determine the nature, causes, and prevention of voice, speech, and language disorders. Disorders involving voice, speech, or language, as well as swallowing, can have an overwhelming effect on an individual's health and quality of life; they affect people of all ages with or without hearing impairment, including children with autism and adults with aphasia or other speech disorders. Therefore, NIDCD continues its commitment to develop effective diagnostic and intervention strategies for people with voice, speech, or language impairments. For example, NIDCD is participating in an initiative to study the delayed effects of traumatic brain injury (TBI) as a foundation for future studies to develop *in vivo* diagnostic tools related to voice, speech, and language disorders. In addition, NIDCD is supporting a unique public-private partnership that will create an open-access Information Commons of integrated clinical, imaging, proteomic, genomic, and outcome measurements to permit more precise TBI diagnosis, prognosis, and treatment. Lastly, NIDCD is participating in a joint initiative to develop and evaluate a sideline eye tracker test for a rapid, objective, and accurate assessment of sports-related concussion/mild TBI. This initiative will support eight projects administered by three ICs (NINDS, NICHD, and NIDCD). The funding for this initiative was made possible by the Foundation for the National Institutes of Health, Inc., through a gift from the National Football League.

⁸ <http://www.nidcd.nih.gov/health/statistics/vsl.asp>.

⁹ U.S. Preventive Services Task Force, Screening for Speech and Language Delay in Preschool Children, <http://www.ahrq.gov/clinic/uspstf06/speech/speechrev.htm>. Shriberg LD, Tomblin JB, McSweeney JL. Prevalence of speech delay in 6-Year-old children and comorbidity with language impairment. *J Speech Lang Hear Res* 42: 1461-1481, 1999.

¹⁰ <http://www.nidcd.nih.gov/health/statistics/vsl.asp>.

Program Portrait: Aphasia

FY 2014 Level: \$17.0 million

FY 2015 Level: 17.0 million

Change: \$0.0 million

Aphasia is a communication disorder that impairs the expression and understanding of language, reading, and writing. It can occur after a stroke or other brain injury. More than a million people in the U.S. currently have aphasia and, according to the National Aphasia Association, an additional 100,000 Americans acquire aphasia from strokes and other causes every year.

To address this public health need, NIDCD-supported scientists are attempting to determine the underlying problems that cause certain symptoms of aphasia. The goal is to understand how injury to a particular part of the brain impairs a person's ability to convey and understand language. The results could be useful in treating various types of aphasia, since the treatment may change depending upon the cause of the language problem. For instance, in FY 2014, the NIDCD awarded a five-year, \$12 million clinical research center grant to Northwestern University in Chicago to establish the Center for the Neurobiology of Language Recovery. The center will bring top aphasia researchers from Northwestern, Johns Hopkins, Harvard, and Boston universities together to do large-scale investigations that shed light on how language is processed in healthy people and how language recovers when impaired by stroke or other neurological disease processes. The multidisciplinary, multi-institution program is expected to significantly impact clinical intervention practices for individuals with aphasia as well as expand knowledge about brain plasticity and the reorganization of language functions. The center, which will study more than 200 patients, also will generate a large database for other scientists to access.

In addition to supporting this new center, NIDCD continues to pursue activities aimed at helping to foster the development of effective treatment options to improve a person's ability to communicate by helping him or her to use remaining language abilities, restore language abilities as much as possible, compensate for language problems, and learn other methods of communicating. As such, NIDCD recently supported two conferences related to aphasia treatment. Additionally, NIDCD is supporting research that involves sophisticated brain imaging tools to improve our understanding of how areas of the brain reorganize after brain injury. The results could have implications for both the basic understanding of brain function and the diagnosis and treatment of neurological diseases.

Budget Policy:

The FY 2015 President's Budget for the Voice, Speech, and Language program is \$88.635 million, an increase of \$0.372 million or 0.4 percent from the FY 2014 Enacted level. In FY 2015, the program will continue emphasizing faculty, postdoctoral, and student training on voice, speech, and language sciences. Trained investigators will be encouraged to choose a research career through the Pathways to Independence program. Making R01 awards to first-time and early-stage investigators in the area of voice, speech, and language sciences will be given funding priority.

Intramural Research Program: The NIDCD Intramural Research Program conducts basic and clinical research in human communication. Research projects include: the genetics of hearing, taste, and stuttering in human and mouse models; identifying genes, molecules, and mechanisms important for normal development and function of the inner ear and the auditory (hearing) nerve; observing normal and disordered communication in action by neuroimaging and computer modeling of brain function; describing how auditory nerve cells communicate, and discovering interventions to prevent or reverse hearing loss caused by genetic mutations, noise, or drugs. In the past year, NIDCD intramural scientists identified a gene associated with both noise-induced and age-related hearing loss. The gene, P2X2, appears to be crucial for life-long normal hearing and for protection from hearing loss caused by noise exposure. Another group of intramural

scientists identified two inner ear proteins, called TMC1 and TMC2, which are critical for hearing. The proteins made from these genes form part of the ion channels that turn mechanical sound waves into electrical signals that, in turn, tell the brain that a sound has been detected. Mutations in these proteins may cause a type of delayed, progressive hearing loss.

The intramural program is also working to maintain a cadre of individuals who are well-trained in communications sciences. The NIDCD Otolaryngology Surgeon-Scientist Career Development Program is a mentored, junior faculty career development program within the NIDCD Intramural Research Program. During a two- to five-year period, the trainees design and implement a career development plan while conducting a translational research project in the scholarly and scientifically rigorous environment of the NIDCD Intramural program. Trainees have the opportunity to continue to use their surgical skills. NIDCD is also accepting its first batch of applications for the Robert Wenthold Postdoctoral Research Fellowship in Communication Sciences. Named after the former NIDCD Scientific Director, this new Fellowship is designed to provide trainees with skills needed for success in a long-term independent research career in the multidisciplinary field of communication sciences. Trainees will be exposed to new scientific approaches and methodologies, with the opportunity for multidisciplinary training and structured mentoring. The goal of both training programs is to prepare researchers to compete for faculty positions at the NIH and other premier institutions around the world, and who will produce a body of work that substantially advances our understanding and clinical management of human communication disorders.

Program Portrait: Drug-Induced Hearing Loss

FY 2014 Level: \$1.4 million

FY 2015 Level: \$1.4 million

Change: \$0.0 million

Over half a million Americans experience hearing loss every year from ototoxic drugs—drugs that can damage hair cells in the inner ear. These include some antibiotics and the chemotherapy drug cisplatin. NIDCD intramural scientists are studying various strategies to preserve hearing without interfering with the therapeutic benefits of these drugs. The scientists are studying the specialized sensory cells in the inner ear, called hair cells. These cells convert sound into neural signals that are transmitted to the brain. The delicate hair cells can die as a result of exposure to a variety of stresses, including aging, noise trauma, genetic mutations, and some therapeutic drugs that a person might receive in the clinic. These drugs are beneficial in treating infections or cancer, but they also have the potential side effect of causing hearing loss because the drugs are toxic to hair cells in the inner ear.

When human hair cells die, they are not replaced. If someone loses enough hair cells, the result is permanent hearing loss. The scientists are conducting animal studies aimed at understanding the cellular and molecular mechanisms that underlie hair cell stress and death. Earlier work by the scientists showed that HSP70—a protein produced by the supporting cells in the inner ear after exposure to stressors—can protect hair cells. Additional experiments showed that the supporting cells secrete HSP70, which can then protect neighboring hair cells from cell death after exposure to an ototoxic antibiotic. Further, when the scientists used methods to prevent supporting cells from producing or secreting HSP70, this protective effect disappeared.

The lab is beginning a clinical trial to evaluate a novel treatment method to prevent hair cell death and hearing loss in individuals who need these life-saving drugs. The human trial will examine ways to induce the production of HSP70 in the inner ear before these individuals are administered ototoxic drugs.

Budget Policy:

The FY 2015 President’s Budget for the Intramural Research Program is \$37.220 million, the same as the FY 2014 Enacted level. The NIDCD Intramural Research Program has been a leader in research on hereditary hearing impairment and has identified many genes whose mutation causes hearing loss. In FY 2015, NIDCD intramural scientists will continue their efforts in identifying mutation in genes, which impacts hearing, and identifying or studying additional genes involved in communication disorders in humans and animal models.

Research Management and Support (RMS) Program: NIDCD RMS activities provide administrative, budgetary, logistical, and scientific support in the review, award, and monitoring of research grants, training awards, and research and development contracts. RMS functions also include strategic planning, coordination, and evaluation of the Institute’s programs, regulatory compliance, international coordination, and liaison with other Federal agencies, Congress, and the public. The Institute currently oversees over 1,300 research grants, training awards, and R&D contracts.

In 2013, NIDCD celebrated its 25th anniversary with a special anniversary website that showcases a timeline of NIDCD milestones and scientific discoveries and an infographic describing the remarkable public health impact from NIDCD-supported research on newborn hearing detection and the benefits of early intervention (<http://www.nidcd.nih.gov/about/Pages/NIDCD-25th-Anniversary.aspx>). NIDCD’s efforts ultimately led to legislation supporting statewide newborn and infant hearing screen programs, resulting in the screening of nearly all infants born in U.S. hospitals for hearing loss as of 2010,

up from as few as one-tenth infants screened in 1993. The NIDCD also published several articles in NIDCD's mission areas of research (hearing, balance, taste, smell, voice, speech, and language) in the Fall 2013 issue of the National Library of Medicine's MedlinePlus magazine.

The NIDCD continues to expand its use of social media to disseminate evidence-based information and held its first Twitter chat on noise-induced hearing loss and how to prevent it. The chat featured experts from the NIDCD and the National Institute for Occupational Safety and Health. The NIDCD also hosted a tour of its clinical labs for congressional staffers and advocacy group members from the Friends of the Congressional Hearing Health Caucus. In addition, the NIDCD completed an evaluation of its five-year public education campaign to increase awareness in parents and pre-teens about noise-induced hearing loss, called *It's A Noisy Planet. Protect Their Hearing*®. The evaluation shows that the campaign's message and materials are useful and effective, and reach the campaign's target audiences. The evaluation also highlights the need for more promotional tools to encourage healthy behaviors and efforts to reach a broader segment of the U.S. population.

Budget Policy:

The FY 2015 President's Budget for the RMS program is \$19.940 million, the same as the FY 2014 Enacted level. NIDCD will continue to manage activities of the NIH Stem Cell Task Force.

NATIONAL INSTITUTES OF HEALTH
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Budget Authority by Object Class¹
(Dollars in Thousands)

	FY 2014 Enacted	FY 2015 President's Budget	FY 2015 +/- FY 2014
Total compensable work years:			
Full-time employment	140	140	0
Full-time equivalent of overtime and holiday hours	0	0	0
Average ES salary	\$173	\$173	\$0
Average GM/GS grade	12.7	12.8	0.1
Average GM/GS salary	\$102	\$103	\$1
Average salary, grade established by act of July 1, 1944 (42 U.S.C. 207)	\$103	\$103	\$0
Average salary of ungraded positions	\$143	\$143	\$0
OBJECT CLASSES	FY 2014	FY 2015	FY 2015
Personnel Compensation			
11.1 Full-Time Permanent	\$10,542	\$10,681	\$139
11.3 Other Than Full-Time Permanent	4,825	4,908	83
11.5 Other Personnel Compensation	146	149	3
11.7 Military Personnel	97	100	3
11.8 Special Personnel Services Payments	1,771	1,806	35
11.9 Subtotal Personnel Compensation	\$17,381	\$17,645	\$264
12.1 Civilian Personnel Benefits	\$4,809	\$4,980	\$171
12.2 Military Personnel Benefits	50	52	2
13.0 Benefits to Former Personnel	0	0	0
Subtotal Pay Costs	\$22,240	\$22,677	\$437
21.0 Travel & Transportation of Persons	\$292	\$296	\$5
22.0 Transportation of Things	86	87	1
23.1 Rental Payments to GSA	1	1	0
23.2 Rental Payments to Others	0	0	0
23.3 Communications, Utilities & Misc. Charges	272	277	5
24.0 Printing & Reproduction	0	0	0
25.1 Consulting Services	\$261	\$265	\$4
25.2 Other Services	1,673	1,702	28
25.3 Purchase of goods and services from government accounts	\$39,772	\$40,409	\$637
25.4 Operation & Maintenance of Facilities	\$409	\$418	\$9
25.5 R&D Contracts	4,618	4,396	-221
25.6 Medical Care	399	418	19
25.7 Operation & Maintenance of Equipment	674	692	17
25.8 Subsistence & Support of Persons	0	0	0
25.0 Subtotal Other Contractual Services	\$47,805	\$48,298	\$493
26.0 Supplies & Materials	\$2,232	\$2,270	\$38
31.0 Equipment	3,690	3,753	63
32.0 Land and Structures	0	0	0
33.0 Investments & Loans	0	0	0
41.0 Grants, Subsidies & Contributions	326,875	326,273	-602
42.0 Insurance Claims & Indemnities	0	0	0
43.0 Interest & Dividends	0	0	0
44.0 Refunds	0	0	0
Subtotal Non-Pay Costs	\$381,253	\$381,256	\$3
Total Budget Authority by Object Class	\$403,493	\$403,933	\$440

¹ Includes FTEs whose payroll obligations are supported by the NIH Common Fund.

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Salaries and Expenses
(Dollars in Thousands)

OBJECT CLASSES	FY 2014 Enacted	FY 2015 President's Budget	FY 2015 +/- FY 2014
Personnel Compensation			
Full-Time Permanent (11.1)	\$10,542	\$10,681	\$139
Other Than Full-Time Permanent (11.3)	4,825	4,908	83
Other Personnel Compensation (11.5)	146	149	3
Military Personnel (11.7)	97	100	3
Special Personnel Services Payments (11.8)	1,771	1,806	35
Subtotal Personnel Compensation (11.9)	\$17,381	\$17,645	\$264
Civilian Personnel Benefits (12.1)	\$4,809	\$4,980	\$171
Military Personnel Benefits (12.2)	50	52	2
Benefits to Former Personnel (13.0)	0	0	0
Subtotal Pay Costs	\$22,240	\$22,677	\$437
Travel & Transportation of Persons (21.0)	\$292	\$296	\$5
Transportation of Things (22.0)	86	87	1
Rental Payments to Others (23.2)	0	0	0
Communications, Utilities & Misc. Charges (23.3)	272	277	5
Printing & Reproduction (24.0)	0	0	0
Other Contractual Services:			
Consultant Services (25.1)	261	265	4
Other Services (25.2)	1,673	1,702	28
Purchases from government accounts (25.3)	25,272	24,185	-1,087
Operation & Maintenance of Facilities (25.4)	409	418	9
Operation & Maintenance of Equipment (25.7)	674	692	17
Subsistence & Support of Persons (25.8)	0	0	0
Subtotal Other Contractual Services	\$28,288	\$27,261	-\$1,028
Supplies & Materials (26.0)	\$2,232	\$2,270	\$38
Subtotal Non-Pay Costs	\$31,170	\$30,191	-\$979
Total Administrative Costs	\$53,410	\$52,868	-\$542

NATIONAL INSTITUTES OF HEALTH
National Institute on Deafness and Other Communication Disorders

Detail of Full-Time Equivalent Employment (FTE)

OFFICE/DIVISION	FY 2013 Actual			FY 2014 Est.			FY 2015 Est.		
	Civilian	Military	Total	Civilian	Military	Total	Civilian	Military	Total
Division of Extramural Activities									
Direct:	20		20	20		20	20		20
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	20		20	20		20	20		20
Division of Intramural Research Program									
Direct:	61	1	62	63	1	64	63	1	64
Reimbursable:	4		4	4		4	4		4
Total:	65	1	66	67	1	68	67	1	68
Division of Scientific Programs									
Direct:	15		15	15		15	15		15
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	15		15	15		15	15		15
Office of Administration									
Direct:	37		37	35		35	35		35
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	37		37	35		35	35		35
Office of the Director									
Direct:	2		2	2		2	2		2
Reimbursable:	-	-	-	-	-	-	-	-	-
Total:	2		2	2		2	2		2
Total	139	1	140	139	1	140	139	1	140
Includes FTEs whose payroll obligations are supported by the NIH Common Fund.									
FTEs supported by funds from Cooperative Research and Development Agreements.	0	0	0	0	0	0	0	0	0
FISCAL YEAR	Average GS Grade								
2011	12.2								
2012	12.4								
2013	12.6								
2014	12.7								
2015	12.8								

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Detail of Positions

GRADE	FY 2013 Actual	FY 2014 Enacted	FY 2015 President's Budget
Total, ES Positions	1	1	1
Total, ES Salary	164,830	173,152	173,152
GM/GS-15	22	22	22
GM/GS-14	21	21	21
GM/GS-13	12	12	12
GS-12	22	22	22
GS-11	7	8	8
GS-10	0	0	0
GS-9	10	9	9
GS-8	4	4	4
GS-7	5	5	5
GS-6	2	2	2
GS-5	1	1	1
GS-4	1	1	1
GS-3	1	1	1
GS-2	0	0	0
GS-1	0	0	0
Subtotal	108	108	108
Grades established by Act of July 1, 1944 (42 U.S.C. 207)	0	0	0
Assistant Surgeon General	0	0	0
Director Grade	0	0	0
Senior Grade	1	1	1
Full Grade	0	0	0
Senior Assistant Grade	0	0	0
Assistant Grade	0	0	0
Subtotal	1	1	1
Ungraded	52	52	52
Total permanent positions	105	105	105
Total positions, end of year	162	162	162
Total full-time equivalent (FTE) employment, end of year	140	140	140
Average ES salary	164,830	173,152	173,152
Average GM/GS grade	12.6	12.7	12.8
Average GM/GS salary	100,862	101,871	102,889

Includes FTEs whose payroll obligations are supported by the NIH Common Fund.